ABSTRACT

Village Sumbersari and Jatiroto Subdistrict Kayen and Village Mangunrekso Subdistrict Tambakromo experienced drought during dry season and floods during rainy season. The purpose of research is to investigate the characteristics of rainfall, volume and discharge of surface water runoff, characteristics of aquifer, potential groundwater flow, water balance, and quality of groundwater in research area, conducted research activities include taking rainfall data from BMKG Semarang, taking water samples, measuring groundwater surface, and 2D geoelectric measurements.

Based on rainfall data from BMKG Semarang for 10 years (2003-2012), derived rainfall plans for 5-year rainfall return period amounted to 140.7717 mm/day with rainfall intensity of 48.8028 mm/hour and 10-year rainfall return period amounted to 164.4209 mm/day and intensity of rain 57.0015 mm/hour. Based on morphology and topography conditions in research area, discovered a rain catchment area with an area of 149.52 km^2, flowing from the hills in the southern part of the research area toward the flat areas in northen part of research area with runoff water discharge at 811.4264 m^3/s for 5-year rainfall return period and 947.7432 m^3/s for 10-year rainfall return period. Aquifer in research area has a moderate level of conductivity with a value of 1,157.10-5 m/s, the porosity is assumed to value 5-30% for sandstone porosity, and the average transmissivity value 0.00012727 m^2/s. Potential of groundwater discharge approximately 0.00017355 to 0.03790332 m^3/s with the direction of water flow from the hills in the southern part of the research area towards the north. Based on the water balance analysis, in 2012 research area had a surplus of water in January to May, August, and in October, November, Decemberand the water deficit in June, July, and September. Whereas in 2009, the surplus water occurred in January and June, August, and in October, November, December and water deficit occurs in June, July, and September. Overall groundwater quality is below the threshold of Peraturan Pemerintah Kesehatan RI No.492/Menkes/Per/IV/2010 about Drinking Water Quality Requirements.

Further groundwater drilling research is needed to analyze the potency of groundwater in research area. Construction of clean water facility required in order residents in research area still be able to consuming water during the dry season and build embankments at rivers in anticipation of flood during the rainy season.